

Claims

1. A method for manufacturing a diamond composite, comprising the steps of;
5 a) mixing diamonds with additives, the mixture comprising at least 50 wt% and less than 95 wt% of diamonds and more than 5 wt% additives,
b) forming a work piece from the mixture using a pressure of at least 100 MPa,
c) heating the formed work piece to at least 300°C for removing possible
10 water and wholly or partially removing additives,
d) heating the work piece and controlling the heating temperature and heating time so that a certain desired amount of graphite is created by graphitization of diamonds, wherein the amount of graphite created by graphitization is 3-50 wt% of the amount of diamond,
15 e) infiltrating silicon or silicon alloy into the work piece, the infiltration of silicon or silicon alloy being performed at a temperature below 1900°C and a pressure less than 50 bars, and
f) heating the infiltrated work piece to form silicon carbide, or other carbides, (and silicides), thereby creating a final diamond composite.
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2. The method according to claim 1, wherein the additives in the mixture comprise binders and/or dispersing agents and/or low-friction agents.
3. The method according to claim 1 or 2, wherein the mixture is
25 agglomerated in order to facilitate forming of the work piece.
4. The method according to claim 1,2 or 3, wherein the forming of the work piece is made by mechanical pressing, injection moulding or roll compaction.

5. The method according to any one of claims 1-4, wherein particles of TiC, BC or SiC are included in the mixture.
- 5 6. The method according to any one of claims 1-5, wherein the forming of the work piece is made at a pressure of at least 300 MPa, preferably below 700 MPa.
7. The method according to any one of claims 1-6, wherein the diamond
10 content of the formed work piece is at least 40 vol%, preferably 70-80 vol%.
8. The method according to any one of claims 1-7, wherein the removing of water and additives by heating the formed work piece is made at a
15 mechanical pressure of at least 500 Pa, preferably at least 3000 Pa.
9. The method according to any one of claims 1-8, wherein more silicon or silicon alloy than the amount needed for forming carbide from the created graphite and filling the pores of the formed carbide skeleton, is provided so
20 that the surplus of silicon or silicon alloy will form a surface coating of at least one surface of the manufactured diamond composite.
10. Use of the method according to claim 1 for forming a substrate for a diamond film.
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11. A diamond composite manufactured by the method according to claim 1, wherein one side of the composite is coated with a thin layer of aluminium nitride.